Hill of Banchory Primary School

Cavity Wall Tie Inspection

October 2016
CONTROL SHEET

CLIENT: Aberdeenshire Council

PROJECT TITLE: Cavity Wall tie inspection at Hill of Banchory Primary School

REPORT TITLE: Cavity Wall tie inspection at Hill of Banchory Primary School

PROJECT REFERENCE: 114941

Issue and Approval Schedule:

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Revision Record:

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Introduction

Fairhurst were instructed by Aberdeenshire Council to undertake an inspection of the existing wall cavity and wall ties within the external wall at Hill of Banchory Primary School. An intrusive survey was carried out on the 13th of Oct 2016. Works involved removing localised pockets of block work outer leaf at roof eaves at 4 locations around the building. Please refer to Fig 1. Elevations showing location of exploratory survey works.

Fig 1. Elevations showing location of exploratory survey works.
**General Building Description**

The school and Nursery are located off Hill of Banchory South Road. The building comprises a 2 storey braced steel frame teaching wings generally and single storey pre-school/nursery building. Games halls are steel frame building and integrate into the overall building scheme. The Internal upper floors are composite metal decking or pre-cast.

The external envelope walls are constructed with render block masonry and block inner leaf with an upper light weight cladding panel system.

Roof construction is a light weight system consisting of steel purlins supporting insulated panel roofing system. Roof cladding system wrap around the building eaves which is consistent detail around the building perimeter.

**Summary of drawing information supplied**

Prior to undertaking survey works we were supplied with the following drawings:

- Ramsay & Chalmers Masonry wall tie detail drawing (dwg No. B2657/323)
- Holmes Partnership block works setting out plan drawings.

**Inspection Procedure**

Inspection of the cavity and ties were carried out at 4 locations around the exterior elevation of the building perimeter using a MEWP platform lift.

Inspection focused on the following key items:

1. Inner masonry leaf head restraint detail.
2. How the outer leaf was restrained at eaves levels.
3. Location of walls ties.
4. Wall ties embedment depths.
Site Observation and Results

Location 1 eaves on West Elevation (Games hall):

Based on inspection wall construction at this location is 100mm outer rendered block, 200mm wide cavity and 140mm inner leaf (assumed)

Generally the wall ties are spaced at 450mm c/c vertically and 900mm c/c horizontally between inner and outer leaf.

Picture 1: Wall head detail

Wall ties at 450mm c/c vertically and 900mm c/c horizontally.

Picture 2: Typical wall arrangement
Location 2 eaves on West Elevation:

Based on inspection wall construction at this location is 100mm outer rendered block, 145mm wide cavity and 140mm inner leaf (assumed)

Generally the wall ties are spaced at 450mm c/c vertically and 900mm c/c horizontally between inner and outer leaf. With the 1st tie starting 450mm below the internal steel beam.

**Picture 1: location of exploratory opening**

Wall ties starts 450mm down from U/S of beam.

Existing ties are 320mm long with an embedment depth of 60mm into outer leaf and 60mm into internal leaf.

**Picture 2: Typical head restraint detail**

No soft joint and head restraint ties. Block work built tight to U/S of beam.
Location 3 eaves on South Elevation:

Based on inspection wall construction at this location is 100mm outer rendered block, 145mm wide cavity and 140mm inner leaf (assumed)

Generally the wall ties are spaced at 450mm c/c vertically and 900mm c/c horizontally between inner and outer leaf. With the 1st tie starting 450mm below the internal steel beam.

No soft joint and head restraint ties. Block work built tight to U/S of beam.

Wall ties starts 225mm down from U/S of beam.
Existing ties are 320mm long with an embedment depth of 55mm into outer leaf and 65mm into internal leaf.

Picture 1: Typical head restraint detail

Wall ties with poor embedment.

Picture 2: Wall tie embedment
Location 4 eaves on North Elevation:

Based on inspection wall construction at this location is 100mm outer rendered block, 130mm wide cavity and 140mm inner leaf (assumed)

Generally the wall ties are spaced at 450mm c/c vertically and 900mm c/c horizontally between inner and outer leaf. With the 1st tie starting 450mm below the internal steel beam.

Picture 1: internal picture of cavity
Conclusion/Concerns

1. Where wall ties have been encountered the depth of embedment is adequate, except at location 3 on South Elevation.

2. There are no head restraint ties to the inner leaf in all locations where we investigated.

3. Table below summarising the locations of upper most ties relative to the U/S of internal steel beams and distance to top of outer leaf.

<table>
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<th>Locations</th>
<th>Distance from U/S of steel</th>
<th>Height from tie to top of outer leaf</th>
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<tr>
<td>1.</td>
<td>330mm</td>
<td>330mm</td>
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<tr>
<td>2.</td>
<td>450mm</td>
<td>450mm</td>
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<tr>
<td>3.</td>
<td>225mm</td>
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<td>4.</td>
<td>440mm</td>
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It appears the single storey building outer leaf is not tied back to existing structure and propose the following remedial works to help restrain the block outer leaf (please see details 1 below):

- Stainless steel self-tapping fixing to tie out leaf back to steel work.

Details 1: Proposed remedial detail at typical roof overhang locations
**Internal head restraint detail**

At locations invested where no head restraint ties were found, we will require verification that all wall panels were designed as unrestrained and have sufficient capacity to resist required wind loads including local effects.

**Remedial wall ties at survey location 3 on South Elevation (between movement joint and curtain walling)**

At this location wall ties were found to be have poor embedment we would recommend that Helifix Dryfix or equivalent remedial wall ties are installed for the first 4 courses of block work from under side of beam.